

**WHAT IS CLAIMED IS:**

1. Extruded profiled element based on a cross-linkable rubber composition, the said profiled element being intended to constitute in the cross-linked condition a tread for a tyre and being delimited in width by two lateral faces which connect to one another radially inner and outer faces of the said tread, conducting means being provided in the said profiled element to connect the said inner face electrically to the said outer face between the said lateral faces and all along the length of the said profiled element, the remainder of the profiled element being based on an electrically insulating material, characterized in that the said conducting means, viewed in a cross-section of the said profiled element, have a layered structure comprising electrically conducting layers which are essentially concentric and have a curvature towards at least one of the said inner and outer faces, and at least one of the said layers emerges at the surface of the said outer face.

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2. Extruded profiled element according to Claim 2, characterized in that the said electrically conducting layers, viewed in a cross-section of the said profiled element, describe a plurality of turns essentially around the longitudinal axis of symmetry of the said profiled element.

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3. Extruded profiled element according to Claim 2, characterized in that the said electrically conducting layers are globally wound in a spiral around the said longitudinal axis and, viewed in a cross-section of the said profiled element, the said layers have essentially the shape of an arc of a flattened ellipse whose major axis corresponds to the transverse direction of the said profiled element.

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4. Extruded profiled element according to Claim 2, characterized in that the said electrically conducting layers, along the length of the profiled element, have a filamentary shape comprising a plurality of helicoidal filaments ( $F_j$  ( $j = 1$  to  $m$ )) which are centered on the said axis.
- 5            5. Extruded profiled element according to Claim 4, characterized in that along the length of the profiled element, the said filamentation comprises a succession of identical sections ( $T_i$  ( $i = 1$  to  $n$ )) each consisting of a plurality of conical filaments ( $F_j$  ( $j = 1$  to  $m$ )) inscribed on cone sections substantially parallel to one another and centered on the said axis ( $X'X$ ).
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- 15           7. Extruded profiled element according to Claim 6, characterized in that the said electrically conducting layers, viewed in a cross-section of the said profiled element, describe a number of turns essentially between 30 and 70.
- 20           8. Extruded profiled element according to Claim 7, characterized in that the said electrically conducting layers each have a thickness essentially between 0.05 and 0.15mm.
9. Extruded profiled element according to Claim 1, characterized in that at least one of the said electrically conducting layers emerges at the surface of one or of each lateral face of the said profiled element.

10. Extruded profiled element according to Claim 1, characterized in that the said conducting means also comprise a conducting film at the location of one or of each lateral face of the said profiled element.

5 11. Extruded profiled element according to Claim 1, characterized in that the said conducting means consist of a rubber composition containing carbon black or the reinforcing filler and having an electrical resistivity lower than  $10^8 \Omega \cdot \text{cm}$ .

10 12. Extruded profiled element according to Claim 1, characterized in that the said conducting means consist of a rubber composition based on at least one diene elastomer comprising an inorganic reinforcing filler as the reinforcing filler and a conducting ionic solution comprising:

- a polyether which is a copolymer of oxyethylene and oxypropylene containing a majority of oxyethylene units, preferably in an amount between 20 and 50 phr (phr: parts by weight per 100 parts of the elastomer(s)),
- 15 • an ionic salt of a monovalent or divalent metal, such as lithium perchlorate or zinc dichloride, preferably in an amount between 5 and 30 phr, and
- a polar solvent, such as polypropylene glycol carbonate, preferably in an amount between 5 and 15 phr.
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13. Extruded profiled element according to Claim 12, characterized in that the said polyether has an inherent viscosity, measured at 25°C in toluene, which is higher than 4 dl/g.

25 14. Process for obtaining an extruded profiled element according to Claim 12, characterized in that it consists in the following:

- introducing, on the one hand the said electrically insulating material for a tread into an input of a main extruder which opens coaxially into an

extrusion head, and on the other hand the said electrically conducting material intended to constitute the said conducting means having a layered structure into an input of at least one satellite extruder which opens radially upstream from the said extrusion head inside the said main extruder,

- propelling the said insulating material and the said conducting material within the said extruders,
- producing, within the said main extruder and upstream from the said extrusion head, a uniformly distributed mixture of the said insulating material and the said conducting material, the mass fraction of the insulating material in the said mixture being equal to or greater than 80% and that of the conducting material being less than or equal to 20%, and
- passing the said mixture into a channel of the said extrusion head to obtain, at the outlet of an extrusion orifice of the said extrusion head, the said extruded and cross-linkable profiled element for a tread.

15. Process for obtaining an extruded profiled element according to Claim 14, **characterised in that** the temperature inside each extruder is between 70° and 90°C.

16. Process for obtaining an extruded profiled element according to Claim 14, characterized in that the absolute pressure inside the said extrusion head is between 20 and 30 bars.

17. Cross-linkable or cross-linked tread for a tire, characterized in that it consists of an extruded profiled element according to Claim 1.

18. Tire, characterized in that it comprises a cross-linked tread according to Claim 17.

19. Cross-linkable or cross-linked tread for a tyre, delimited laterally by two lateral faces which connect radially inner and outer faces to one another, the said tread being based on an electrically insulating material and comprising at its circumference at least one axial conducting layer which essentially connects the said lateral faces to one another and which has a resistivity lower than that of the said insulating material, which is provided radially on both sides of the said layer in the said tread, characterized in that the said conducting layer consists of a rubber composition based on at least one diene elastomer containing an inorganic reinforcing filler as the reinforcing filler and a conducting ionic solution comprising:
- a polyether which is a copolymer of oxyethylene and oxypropylene containing a majority of oxyethylene units, preferably in an amount between 20 and 50 phr (phr: parts by weight per 100 parts of the elastomer(s)),
  - an ionic salt of a monovalent or divalent metal, such as lithium perchlorate or zinc dichloride, preferably in an amount between 5 and 30 phr, and
  - a polar solvent, such as polypropylene glycol carbonate, preferably in an amount between 5 and 15 phr.

20. Tread according to Claim 19, characterized in that the said polyether has an inherent viscosity, measured at 25°C in toluene, which is higher than 4 dl/g.

21. Tread according to Claim 19, characterized in that it comprises a conducting film at the position of one or of each lateral face, which connects the said inner and outer faces electrically to one another.

22. Tire, characterized in that it comprises a cross-linked tread  
5 according to Claim 21.